P517840.PDF [Page: 3 of 13]

SL 2001-121

International Journal of Stress Management, Vol. 9, No. 2, April 2002 (© 2002)

Police Officer Performance Under Stress: A Pilot Study on the Effects of Visuo-Motor Behavior Rehearsal

Peter Shipley[1] and Joseph V. Baranski[2,3]

This study examined the effectiveness of visuo-motor behavior rehearsal (*VMBR*) *as a method of reducing acute stress and improving police officer performance. Fifty-four recruits were randomly assigned to a treatment and a nontreatment condition prior to undergoing a highly stressful, critical event training scenario involving "live fire." A manipulation check showed that participants who received VMBR displayed significantly lower scores on the cognitive state anxiety subscale of the Competitive State Anxiety Inventory-2, somatic state anxiety and self-confidence were unaffected by the VMBR treatment. Most importantly, participants in the VMBR training condition displayed better performance on the critical event scenario, including significantly more assailant "hits." The findings are discussed with respect to the four-stage model of stress and human performance of Salas and colleagues*

KEY WORDS: visuo-motor behavior rehearsal, police performance, stress

The ability to manage high levels of acute stress is an important determinant of successful performance in many occupations. In athletic competitions, for example, the ability to stay calm can mean the difference between winning and losing; in high-risk occupations, such as policing, it can mean the difference between life and death.

In the vast sports psychology literature, numerous studies have demon-

[1]Ontario Provincial Police Academy, Orillia, Canada.
[2]Defence and Civil Institute of Environmental Medicine, Toronto, Canada.
[3]Correspondence should be directed to Joseph V. Baranski, Human Factors of Command Systems section, Defence and Civil Institute of Environmental Medicine, 1133 Sheppard Ave. West, P.O. Box 2000, Toronto, Ontario, Canada M3M 3B9, e-mail: joe.baranski@dciem.dnd.ca.

1072-5245/02/0400-0071/0 © 2002 Human Sciences Press, Inc.

P517840.PDF [Page: 4 of 13]

strated the utility of various relaxation techniques in improving athletic performance (Gould & Udry, 1994; Greenspan & Feltz, 1989; Onestak, 1991). In addition, the effectiveness of imagery and mental practice techniques to improve athletic performance under stress is likewise well documented (Feltz & Landers, 1983; Jones & Stuth, 1997; Martin, Moritz, & Hall, 1999; Pavio, 1985). In the early 1970s, Suinn (1972) developed the *visuo-motor behavior rehearsal* (VMBR) technique, a procedure that combined progressive relaxation, mental practice, and performance-related imagery, and found that it clearly had beneficial effects on athletic performance (Suinn, 1984, 1985). Subsequently, a number of studies have confirmed the effectiveness of the technique in sporting domains such as archery (Zervas & Kakkos, 1995), basketball (Hall & Erffmeyer, 1983), karate (Seabourne, Weinberg, & Jackson, 1984; Weinberg, Seabourne, & Jackson, 1981), tennis (Noel, 1980), and racquetball (Gray, 1990). In addition, several studies have confirmed that the VMBR technique is more effective than relaxation or imagery in isolation (Gray, 1990; Hall & Erffmeyer, 1983; Weinberg et al., 1981). Despite the widespread and successful use of VMBR in improving athletic performance, surprisingly few studies have sought to extend its application to other occupational contexts. Accordingly, the primary objective of the present study was to explore the potential utility of the VMBR technique in application to one of the most stressful occupations—police work.

In recent years, a considerable research effort has been aimed at the important topic of stress and coping in police work (Anshel, 2000; Dantzer, 1987; Hart, Wearing, & Headey, 1995). For the most part, this research has focused on occupational issues related to chronic stress, burnout, and attrition. In our research, we were principally concerned with the issue of performance under conditions of acute stress (Driskell & Salas, 1996; Salas, Driskell, & Hughes, 1996). Specifically, we assessed the utility of the VMBR technique as a method of improving performance by reducing the acute stress associated with a dynamic, critical event scenario. Our approach to training for effective performance under stress is based on a distinction between emotion-focused training and problem-focused training, proposed by Keinan and Friedland (1996; see also Lazarus & Folkman, 1984). Keinan and Friedland concluded that emotion-based training, which focuses specifically on the stress response, is likely to be most beneficial when trainees are to be confronted with a stressor (as in the present study) that they cannot control and that is of a relatively brief duration (cf. Whetstone, 1996). The particular training scenario that we examine in the present study is one of many naturalistic scenarios that form part of the training program for the Ontario Provincial Police force. The scenario is highly stressful for the recruits because (a) it comprises a portion of their overall evaluation, (b) it is conducted in isolation from the rest of the class (as in an actual scenario), and (c) it is the only naturalistic scenario they experience that involves an armed confrontation with aggressive assailants (i.e., it is typically the first occasion that the recruits experience being shot at).

P517840.PDF [Page: 5 of 13]

METHOD

Participants

Participants were 54 Ontario Provincial Police recruits who were randomly assigned to either a VMBR treatment condition ($n = 26$ 20 males, 6 females) or a nontreatment control condition ($n = 28$ 20 males, 8 females) The mean age of the participants in each condition was 27 years. All participants were part of the same graduating class and were naive with respect to the nature and aims of the experiment At the time of the study, all participants had successfully completed their 13-week basic training at the Ontario Police College (Aylmer, Ontario) and thus were in the final stages of training for the Ontario Provincial Police force (i e , week 14 of 16) Indeed, the scenario to be described comprises one of the final exercises prior to graduation

Treatment

Participants in the VMBR treatment group were instructed to report to the auditorium 1 hour before the evening simulation, participants in the nontreatment group were instructed to report to the auditorium one-half hour before the evening simulation and were unaware that others were undergoing the VMBR exercise. On arrival at the auditorium, participants in the VMBR treatment group were told that they would be undergoing a relaxation and imagery exercise They were then instructed to have an open mind about the experience and to adopt a relaxed seating position The VMBR procedure involved a progressive relaxation portion (approximately 10 minutes) and an imagery/mental rehearsal portion (approximately 20 minutes) and was administered by the senior author

The progressive relaxation portion of the exercise was based on Shultz (1932, Shultz & Luthe, 1959) and was comprised of a breathing exercise followed by systematic relaxation of major muscle groups, beginning with the head and face and concluding with the calves The imagery/rehearsal portion was comprised of energizing cue words, positive self-statements (e.g , capabilities to deal with stressful events), and imagery (e g , mentally reviewing skill sets acquired during basic training) Overall, the procedure was similar to the original VMBR technique developed by Suinn (1972) in that it combined a relaxation exercise and guided imagery, with appropriate modifications related to policing.

Simulation

Equipment used in the simulation included Ontario Provincial Police cruisers, appropriate firearms (Sig-Saur P229 with modified simunition barrels), simunition F-X Marking cartridges, and simunition-related protective gear (e g ,

P517840.PDF [Page: 6 of 13]

104-05564/

chest protectors and face visors). The scenario was conducted at night and on the grounds of the Provincial Police Academy in Orillia, Ontario. This particular scenario was developed by the Research Training and Development Unit and Campus Course staff and is based on several documented police roadside shootings, although certain details have been changed from the actual incidents.

The scenario began with a "routine" traffic violation. Participants were instructed that the vehicle (a van) in question was observed speeding (i.e., 130 kph in an 80 kph zone). The scenario continued with an actual police pursuit of the suspect vehicle (for safety reasons the pursuit did not proceed at the speeds previously mentioned). As the recruits approached the van, the scenario quickly turned from a routine stop to a deadly force situation. Each recruit was shot at numerous times during the critical event occurrence. In order to induce further stress into the simulation, the participants' firearm permitted a total of only four rounds (i.e., they have access to two magazines, each of which has only two rounds). This information was *not* given to the participants. At no time during the simulation did the suspects "give up," even if they were "wounded." In all cases, the scenario ended only when the safety officer called "end scenario." This occurred when (a) the participant returned fire, disengaged, reloaded, and took effective cover, (b) there was no longer a threat to the participant, or (c) hypervigilance grossly affected the response of the officer (i.e., they "froze"). The latter cases were rerun in order for the recruit to regain their self-confidence, however, performance measures reported in this paper are based on the first scenario.

Outcome Measures

Competitive State Anxiety Inventory

As a manipulation check on the VMBR treatment, all participants (treatment and nontreatment) completed the Competitive State Anxiety Inventory-2 (CSAI-2) just prior to commencing the critical event scenario. The inventory was originally developed for competitive sport athletes (Martens, Vealey, & Burton, 1990) and is designed to measure existing states of cognitive anxiety (CA), somatic anxiety (SA), and self-confidence (SC) in competitive and stressful situations. This inventory was selected for application to the policing field because the competitive and stressful nature of the profession reflects similar states of anxiety evident in athletic competitions (see Martens et al., 1990, for a review of the validation work on the CSAI-2, for a review of additional applications of the CSAI-2 in athletic competitions see Bejek & Hagtvet, 1996; Gould, Petlichkoff, & Weinberg, 1984; Morris, Davis, & Hutchings, 1981; Swain & Jones, 1996). Martens et al. recommended that the CSAI-2 be appro-

P517840.PDF [Page: 7 of 13]

priately renamed for participants in order to reduce potential response bias. Accordingly, the title of the questionnaire was changed to the Provincial Police Academy Self-Evaluation Questionnaire. In addition, Martens et al. suggested that the inventory be completed once, as close to the event in question as possible. The inventory was administered according to the procedure outlined in Martens et al. (pp. 175–178), and the importance of answering the questionnaire as honestly as possible was stressed to participants.

Subjective Evaluations

On completion of the critical event scenario, all participants evaluated their own performance on a scale from 1 (poor) to 5 (excellent) in steps of 0.5, based on how well they thought they dealt with the critical event occurrence. A parallel version of the scale was administered to two Ontario Provincial Police instructors to permit evaluation of the students (the instructors were blind to the treatment conditions of the cadets). Finally, to evaluate the effectiveness of the scenario debriefing, 17 students completed a second self-evaluation after the instructor ranking and simulation debriefing.

Performance

Once the student and instructor evaluations were completed, the facilitator recorded where and how many times the assailants and officers were hit with the simunition.

Procedure

Participants in the treatment condition were instructed to report to the auditorium at 1730 hours and then underwent the VMBR exercise. Participants in the nontreatment condition arrived at the auditorium at approximately 1800 hours. All participants were then given general instructions about the evening simulation and were asked to complete the CSAI-2 scales. The students then proceeded to the grounds of the academy where they commenced the simulation two at a time.

Following each trial of the scenario, the recruits and instructors completed their evaluations of performance; there was a debriefing, and then recordings were taken concerning officer and assailant simunition hits during the scenario. Finally, it is important to note that the postscenario debriefings were very thorough. Although time consuming, this process is crucial when recruits or senior

P517840.PDF [Page: 8 of 13]

officers participate in dynamic simulations. During the debriefing, the purpose of the scenario was explained in detail, their likelihood of survival (had it been an actual event) was stressed, and the reasons for having only four rounds of ammunition were given (i.e., to assess their ability to reload their firearm under stress and to illustrate that if they empty their firearm or have a malfunction, they must quickly implement alternative strategies).

RESULTS

The findings are presented in three sections. The first provides an analysis of the three components of the CSAI-2 scale, the second examines officer performance in the live-fire scenario, and the third provides data on the subjective estimates of performance. Each section relates the outcomes to the presence or absence of the VMBR exercise.

The three components of the CSAI-2 scale were scored using conventional algorithms (Martens et al., 1990). The results for the VMBR treatment condition and the nontreatment condition are provided in panel A of Figure 1. As is evident, the groups did not differ on the Somatic state anxiety and Self-Confidence components of the scale. However, participants in the VMBR treatment condition displayed significantly lower levels on the Cognitive state anxiety component of the CSAI-2 [$t(52) = 1.72$, $p < .05$, one-tailed].

Panel B of Figure 1 provides a view of officer performance during the live-fire scenario. The data on the left show, separately for the two groups, the number of times the officer was hit by the assailant; the data on the right show the number of times the assailant was hit by the officer. Overall, recruits who obtained the VMBR training were hit less often than recruits who did not obtain the training, but this difference was not significant. The right side of panel B shows that participants who received the VMBR training managed more hits to the assailant than those who did not receive VMBR training; this difference was significant [$t(52) = -2.96$, $p < .05$].

Finally, the effect of VMBR training on recruit self-evaluation of performance and instructor evaluation of recruit performance was not significant. However, all recruits self-rated their own performance significantly higher following the debriefing [$t(16) = -2.22$, $p < .05$], confirming that the debriefing was effective in its objectives.

DISCUSSION

The present study has described part of a program aimed at evaluating training simulations, practical occurrence exercises, and potential intervention strategies with the aim of improving the performance of police officers in criti-

P517840.PDF [Page: 9 of 13]

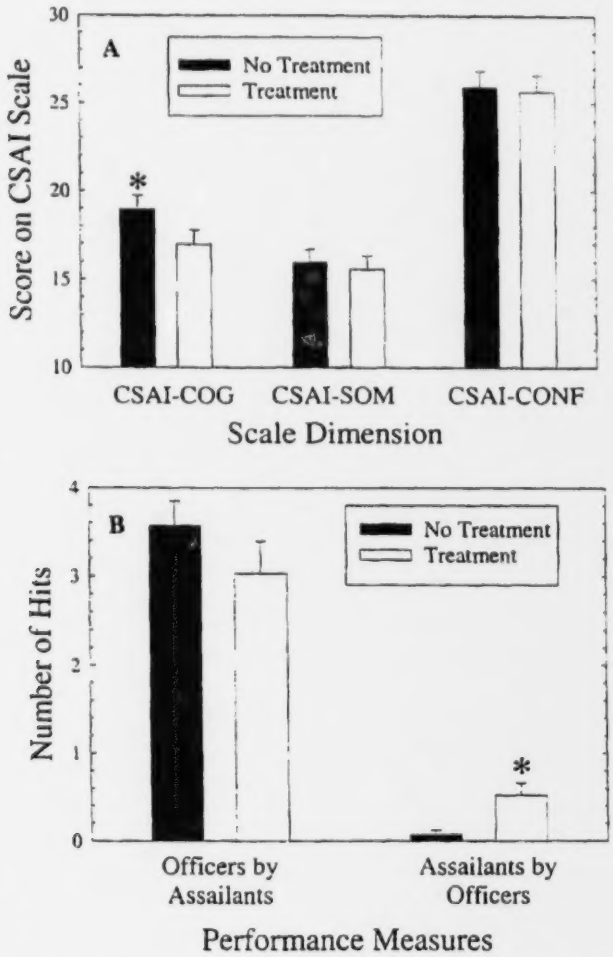

Fig. 1. Panel A. Scores on the three components of the CSAI index separately for the treatment and nontreatment conditions. Panel B. Number of times the officers were hit by the assailants and the assailants were hit by the officers separately for the treatment and nontreatment conditions. Error bars denote the standard error of the mean across participants in each condition. Asterisks denote a significant difference between conditions.

P517840.PDF [Page: 10 of 13]

cal, combative, and highly stressful situations. The long-term objective of the research is to provide empirically based recommendations for police officer training and development programs. The present study focused on the potential utility of a specific intervention, visuo-motor behavior rehearsal, as a method of reducing acute stress responses and improving performance in a critical event scenario. Extending Whetstone's (1996) demonstration that mental rehearsal can improve police officer marksmanship, the findings of this study revealed that VMBR training can reduce cognitive state anxiety and improve police officer performance in a dynamic and stressful live-fire training simulation.

The link between VMBR training and human performance under stress can be conceptualized in the context of a serial four-stage model of stress and performance proposed by Salas, Driskell, and Hughes (1996, cf. Lazarus & Folkman, 1984). According to the model: (a) an environmental stimulus (e.g., threat) becomes salient, (b) it acquires a positive or negative valence through the appraisal process, (c) this leads to the formation of performance expectations, and (d) these, in turn, determine a number of physiological, cognitive, emotional, and social consequences. According to this model, the relationship between situational stress and performance can operate through the appraisal process or as a consequence of the arousal level of the individual. Although physiological measures were not taken in the present study, the findings of the CSAI-2 are suggestive in supporting a cognitively based explanation for the present findings. On this view, VMBR may affect the appraisal process, specifically in terms of one's "evaluation of perceived capacity or resources to meet the threat" (Salas et al., 1996, p. 11). Although the present findings are preliminary, and thus should be interpreted with caution, we hope they will encourage further study on the application of VMBR to stressful work situations. Indeed, the exploration of more situation-specific VMBR regimens, including physiological correlates of stress and self-administered VMBR (see Lohr & Scogin, 1998), provides the focus of our current work in this area.

REFERENCES

Anshel, M. (2000). A conceptual model and implications for coping with stressful events in police work. *Criminal Justice and Behavior, 27*, 375–400.

Anshel, M., Robertson, M., & Caputi, P. (1997). Sources of acute stress and their appraisals and reappraisals among Australian police as a function of previous experience. *British Journal of Occupational and Organizational Psychology, 70*, 337–356.

Bejek, K., & Hagtvet, K. (1996). The content of pre-competitive state anxiety in top and lower level of female gymnasts. *Anxiety, Stress, & Coping: An International Journal, 9*, 19–31.

Carlier, I., Lamberts, R., & Gersons, B. (1997). Risk factors for posttraumatic stress symptomatology in police officers: A prospective analysis. *Journal of Nervous & Mental Disease, 185*, 498–506.

Dantzer, M. (1987). Police related stress: A critique for future research. *Journal of Police Criminal Psychology, 3*, 43–48.

P517840.PDF [Page: 11 of 13]

Driskell J & Salas E (1996) *Stress and human performance* Mahwah NJ Erlbaum
Druckman D & Swets J A (1988) *Enhancing human performance* Washington DC National Academy Press
Feltz D L & Landers D M (1983) The effects of mental practice on motor skill learning and performance A meta-analysis *Journal of Sports Psychology* 5 25–57
Gould D Petlichkoff L & Weinberg R S (1984) Antecedents of temporal changes in and relationships between CSAI-2 subcomponents *Journal of Sport Psychology* 6 289–304
Gould D & Udry E (1994) Psychological skills for enhancing performance Arousal regulation strategies *Medicine & Science in Sports & Exercise* 26 478–485
Gray S (1990) Effect of visuo-motor rehearsal with videotaped modeling on racquetball performance of beginning players *Perceptual & Motor Skills* 70 379–385
Gray S & Fernandez S (1989) Effects of visuo-motor behavior rehearsal with videotaped modeling on basketball shooting performance *Psychology A Journal of Human Behavior* 26 41–47
Greenspan M & Feltz D (1989) Psychological interventions with athletes in competitive situations A review *Sport Psychologist* 3 219–236
Hall E G & Erffmeyer E S (1983) The effect of visuo-motor behavior rehearsal with videotaped modeling on free throw accuracy in intercollegiate female basketball players *Journal of Sport Psychology* 5 343–346
Hart P Wearing A & Headey B (1995) Police stress and well-being Integrating personality, coping and daily work *Journal of Occupational and Organizational Psychology* 68 133–156
Jones L. & Stuth, G (1997) The uses of imagery in athletics An overview *Applied & Preventive Psychology* 6 101–115
Keinan G. & Friedland, N (1996) Training effective performance under stress Queries dilemmas and possible solutions In J Driskell & E Salas (Eds) *Stress and human performance* (pp 257–277) Mahwah NJ Erlbaum
Lazarus R & Folkman, S (1984) *Stress appraisal and coping* New York Springer
Lohr B & Scogin F (1998) Effects of self-administered visuo-motor behavior rehearsal on sport performance of collegiate athletes *Journal of Sport Behavior* 21 206–218
Martens R, Vealey R, & Burton, D (1990) *Competitive anxiety in sport* Champaign Ill Human Kinetics
Martin K, Moritz S & Hall, C (1999) Imagery use in sport A literature review and applied model *Sport Psychologist, 13* 245–268
Morris L W Davis, D & Hutchings C (1981) Cognitive and emotional components of anxiety Literature review and revised worry-emotionality scale *Journal of Educational Psychology 73* 541–555
Murphy, S (1994) Imagery interventions in sport *Medicine & Science in Sport & Exercise* 26 486–494
Neiss R (1988) Reconceptualizing relaxation treatments Psychobiological states in sports *Clinical Psychology Review* 8 139–159
Noel R C (1980) The effect of visuo-motor behavior rehearsal on tennis performance *Journal of Sport Psychology* 2, 221–226
Onestak, D (1991) The effects of progressive relaxation mental practice and hypnosis on athletic performance *Journal of Sport Behavior* 14 247–282
Pavio A (1985) Cognitive and motivational functions of imagery in human performance *Canadian Journal of Applied Sports Sciences 10* 225–285
Salas E Driskell, J E & Hughes, S (1996) The study of stress and human performance In J Driskell & E Salas (Eds) *Stress and human performance* (pp 1–45) Mahwah NJ Erlbaum
Seabourne, T, Weinberg, R & Jackson A (1984) Effect of individualized practice and training of visuo-motor behavior rehearsal in enhancing karate performance *Journal of Sport Psychology* Lansing, New York Sport Science Associates
Shultz J (1932) *Das autogene training* Leipzig G Thieme Verlag
Shultz, J & Luthe W (1959) *Autogenic training Psychophysiologic approach in psychotherapy* New York Grune and Stratton
Suinn, R M (1972) Removing emotional obstacles to learning and performance by visuo-motor behavior rehearsal *Behavioral Therapy 31*, 308–310

P517840.PDF [Page: 12 of 13]

Suinn R M (1984b) Visual motor behavior rehearsal The basic technique *Scandinavian Journal of Behaviour Therapy, 13* 131–142

Suinn R M (1985) Imagery rehearsal applications to performance enhancement *The Behavior Therapist 8* 155–159

Swain A & Jones G (1996) Explaining performance variance The relative contribution of intensity and direction dimensions of competitive state anxiety *Anxiety, Stress & Coping An International Journal 9* 1–18

Weinberg R S Seabourne T & Jackson A (1981) Effects of visuo-motor behavior rehearsal relaxation and imagery on karate performance *Journal of Sport Psychology 3* 228–238

Weinberg R S Seabourne T & Jackson A (1982) Effects of visuo-motor behavior rehearsal on state-trait anxiety and performance Is practice important? *Journal of Sport Psychology 5* 209–219

Whetstone T S (1996) Mental practice enhances police officers acquisition of critical psychomotor skills *Police Studies 19* 19–43

Zervas Y & Kakkos V (1995) The effect of visuomotor behavior rehearsal on shooting performance of beginning archers *International Journal of Sports Psychology 26* 337–347